

# **Supplemental Emission Test Procedures for 2005+ Model Year Heavy-Duty Diesel Engines**

**Public Hearing  
December 8, 2000**



CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY



**Air Resources Board**

# Today's Presentation

- **Background**
- **Staff Proposal**
- **Comparison to Consent Decrees (CD) and Federal Rule**
- **Emission Impacts**
- **Costs**
- **Issues of Concern**
- **Conclusions and Recommendations**

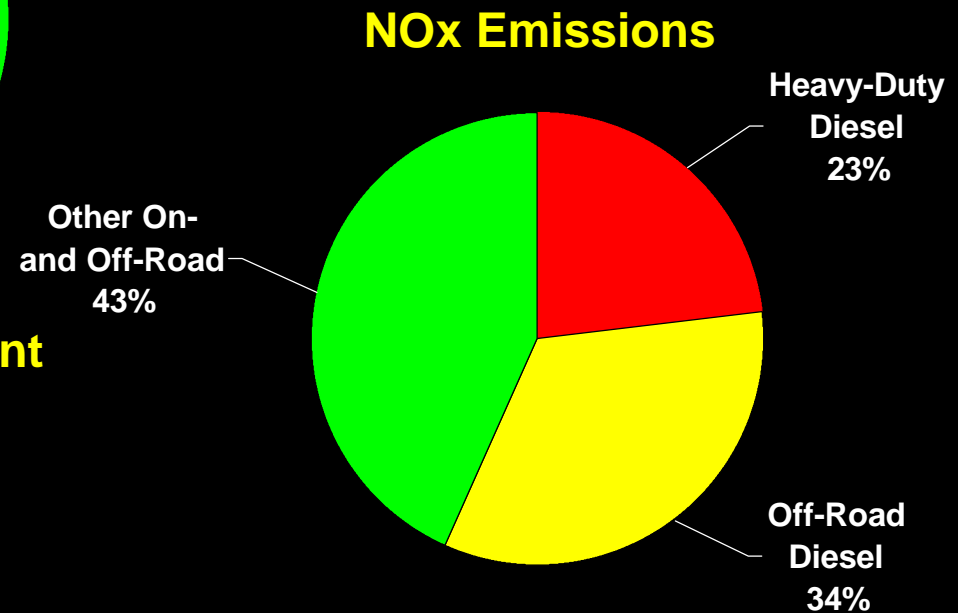
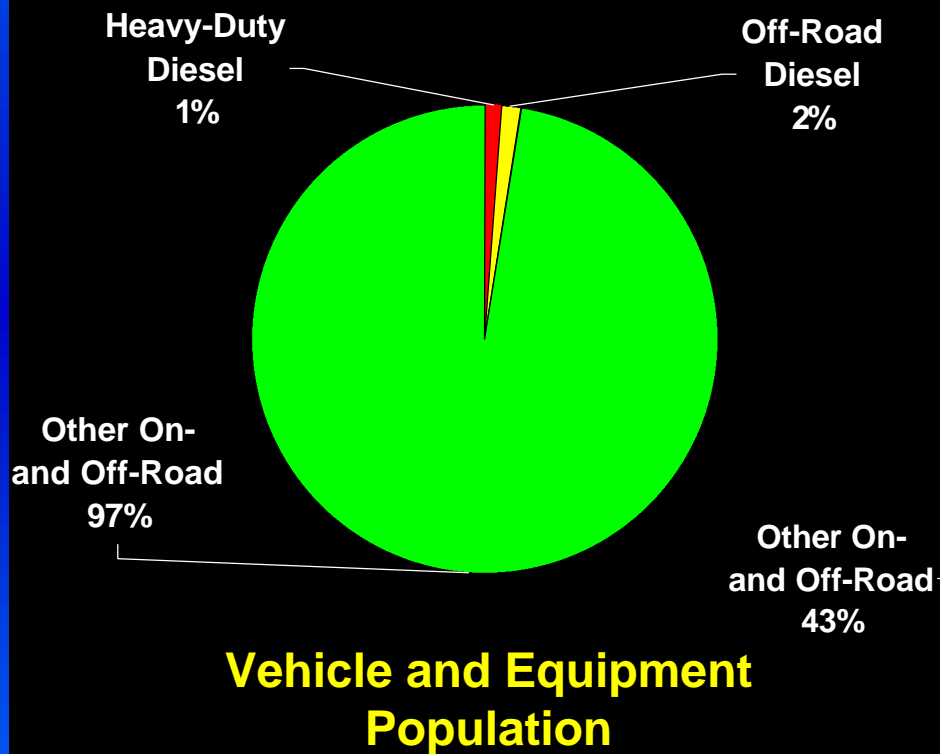
# Background to the Staff's Proposal

- **Between 1988-1998, 7 large manufacturers of heavy-duty diesel engines used “defeat devices”.**
  - **Improved fuel economy.**
  - **Triple emissions.**

# Background to the Staff's Proposal

- **Result: 1998 consent decrees.**
  - Large fines.
  - 2.5 g/bhp-hr standard 15 mos. earlier.
  - New tests representing most operating conditions.
  - Offset excess emissions.

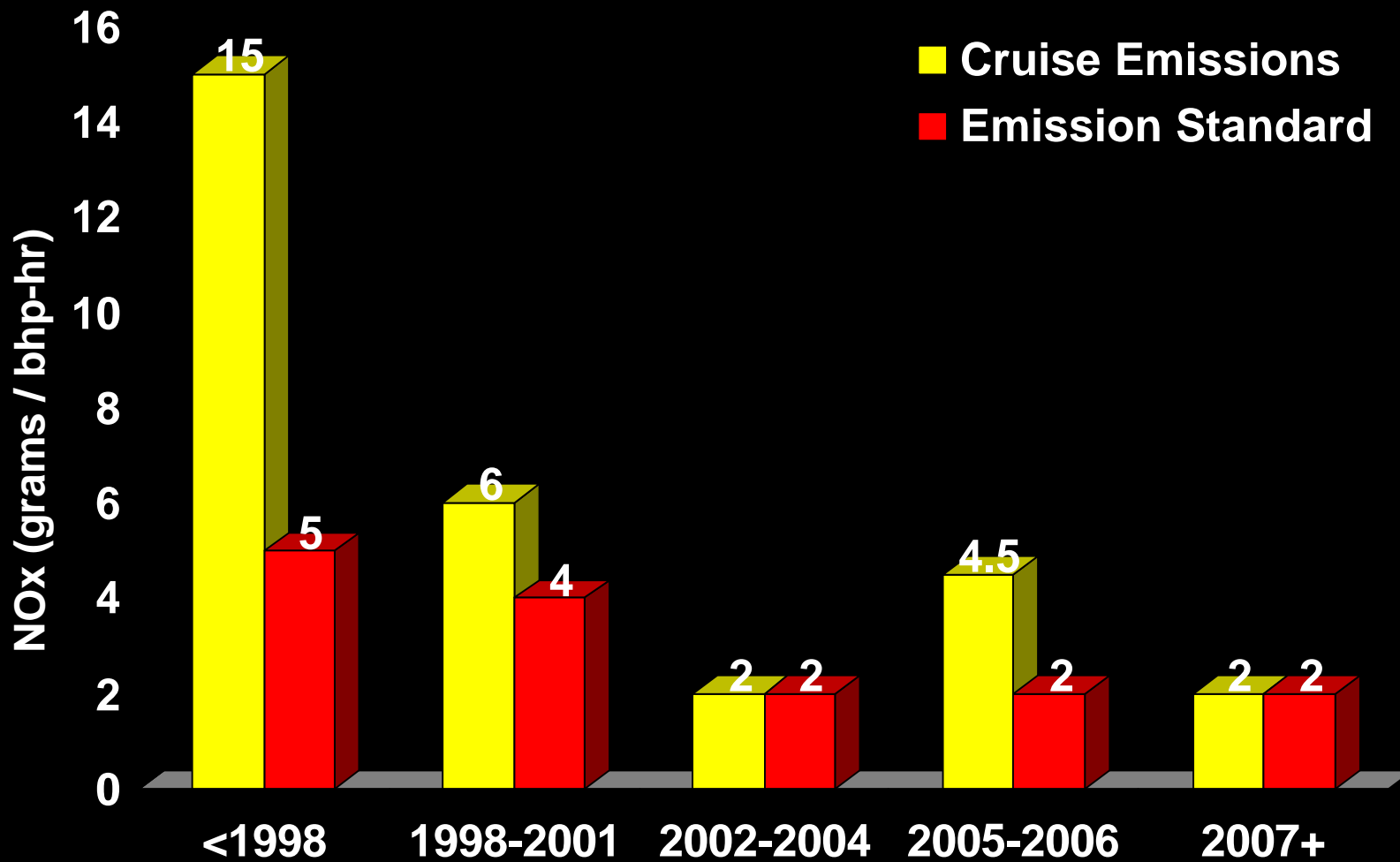
# California Mobile Source Emissions -- 2010



Source: EMFAC2000 baseline inventory

# Excess NOx Emissions\*

## Increase in 2005 and 2006



\* For Heavy Heavy Duty Vehicles (33,000K GVWR and over)

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# What Does This Apply To?



- **Medium Heavy-Duty Diesel**
  - 14,001-33,000 lbs. GVWR

- **Heavy Heavy-Duty Diesel**
  - 33,000+ lbs. GVWR





# Overview of Staff Proposal

- **Supplemental Certification Test Procedures**
  - **Not-to-Exceed (NTE) Test**
  - **European Stationary Cycle (ESC) Test**
  - **Maximum Allowable Emission Limit (MAEL)**

# **The NTE Test Covers Most Operating Conditions**

- **Applies to wider range of in-use operating conditions.**
- **Cap at 1.25x applicable FTP standard.**
- **Deficiency provision in 2005-2007 MY.**

# **The ESC Test Covers Cruising Conditions**

- **Testing at 13 steady state modes.**
  - **Simulates cruising conditions.**
- **Emissions may not exceed FTP standard.**

# **The MAEL Criteria Further Cap “Off-Cycle” Emissions**

- **12 non-idle test modes of ESC test.**
- **Emission cap.**
  - **Cannot exceed the NTE cap + 10%.**
  - **Determine at any operating point.**

# **This Proposal Enables Compliance Testing**

- **Engine dynamometers are currently used for certification and enforcement.**
- **Enforcement testing requires engine removal.**
- **Proposal allows chassis (complete vehicle) testing.**

# Special Exemptions

- **Ultra-Small Volume Manufacturers**

- California sales  $\leq 300$  per year
- Based on previous 3 MYs
- 2005-2006 model years only



- **Urban Buses**



- Title 13, CCR, Section 1956.2
- Urban transit purposes only.
- 2005-2006 MY only

# 2003 Technology Review

- **Settling manufacturers comply with identical requirements in 2002.**
- **Compliance problems revealed before 2002.**
- **2003 Review.**

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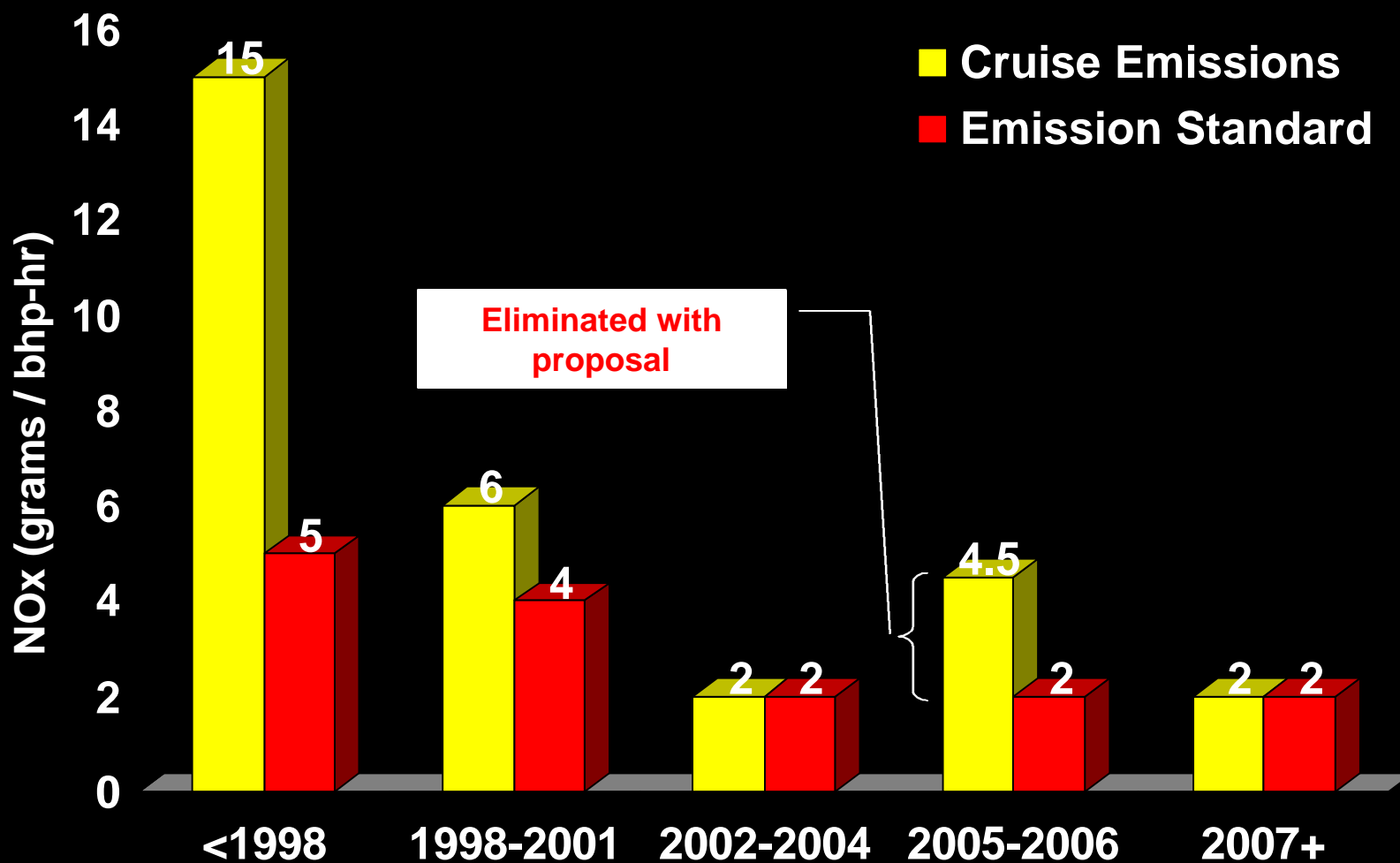
# **Proposal is Consistent With CDs and Federal Rule**

- **NTE test**
- **Euro III ESC test**
- **MAEL test procedure**
- **In-use compliance**
- **Definition of “defeat device”**

# Today's Presentation

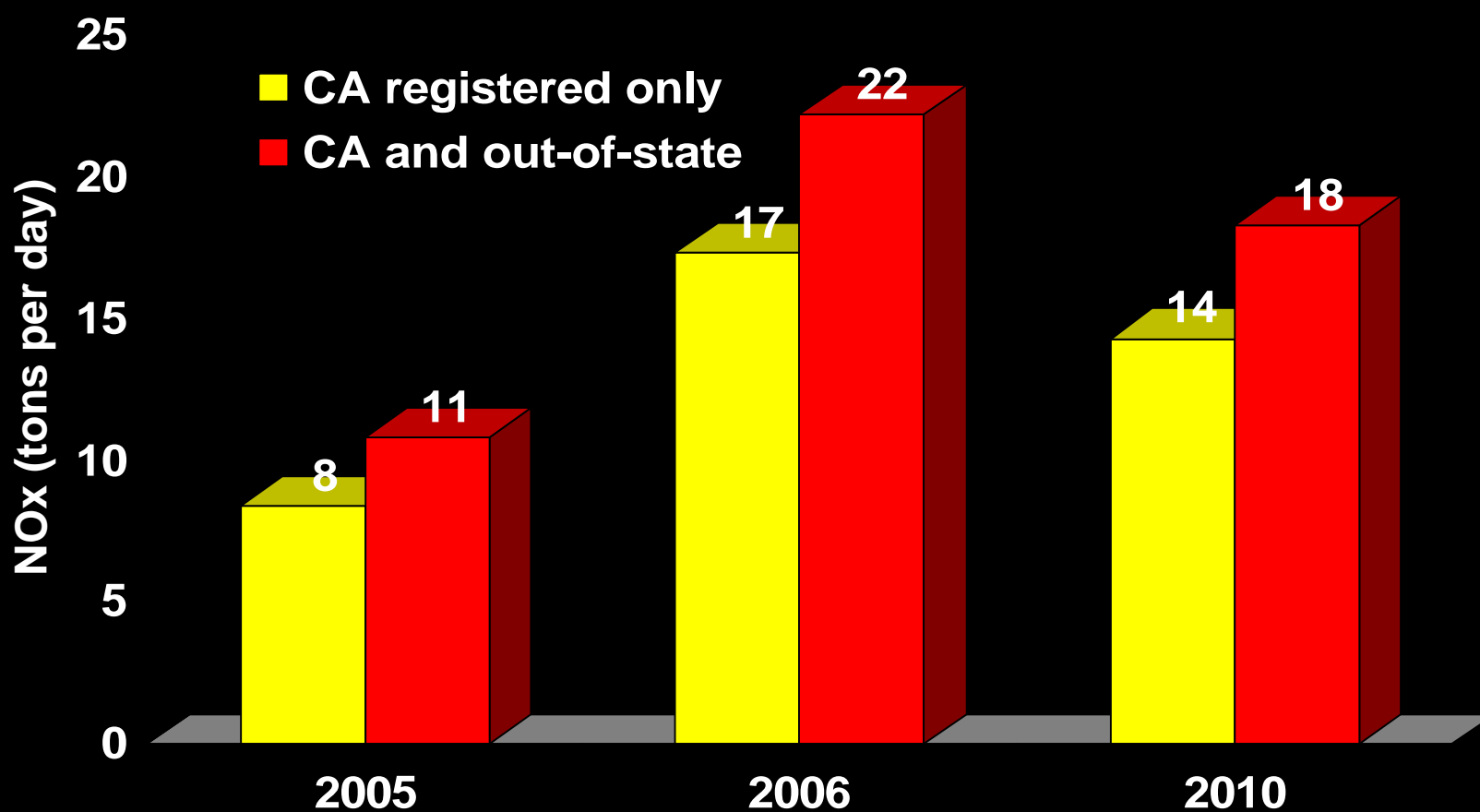
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# Excess NOx Emissions During Cruise\*



\* For Heavy Heavy Duty Vehicles (33,000K GVWR and over)

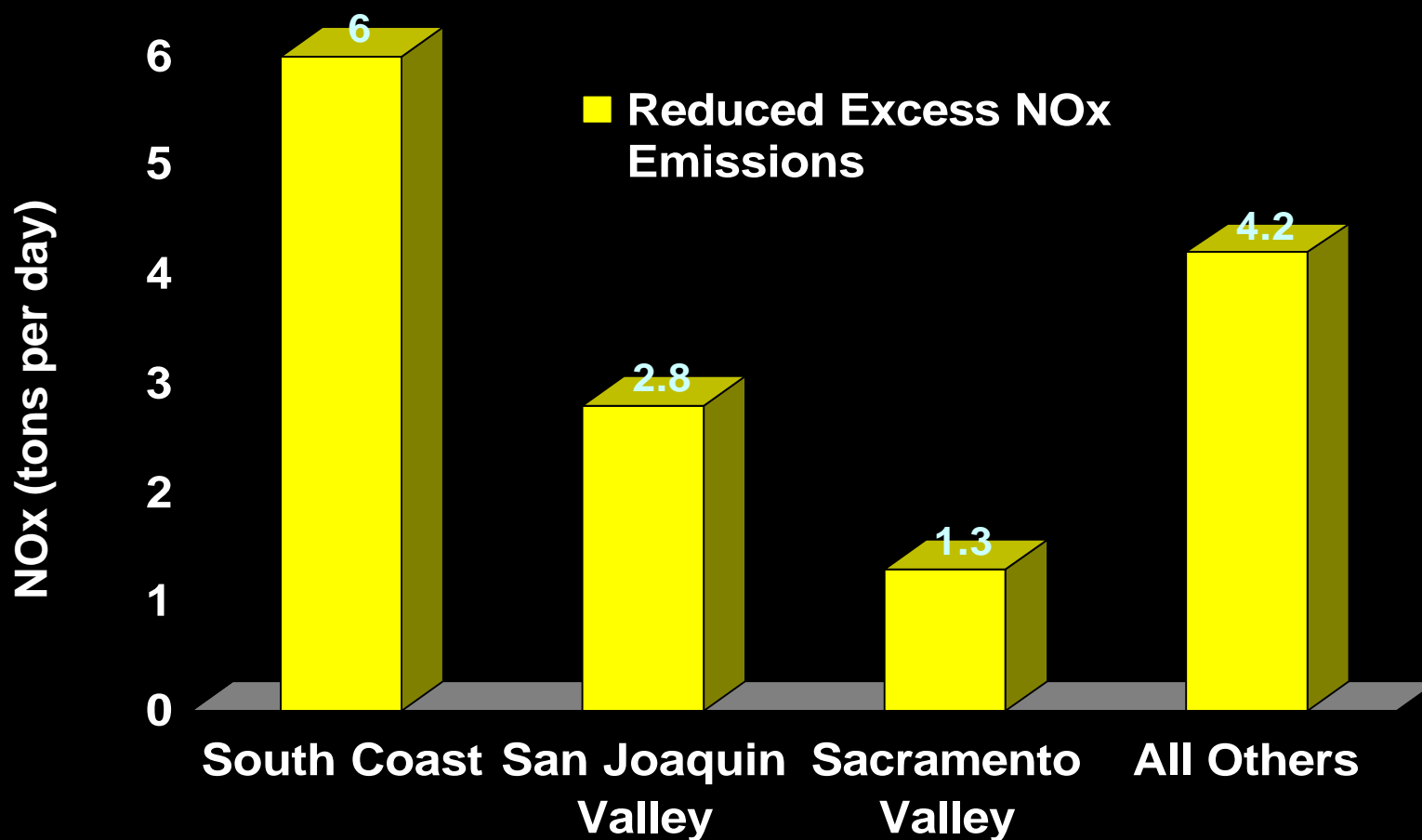
# NOx Reductions in California



Source: EMFAC2000 and incremental emission factor

# NOx Reductions by Air Basin

## 2010 Distribution



Source: EMFAC2000, CA registered only

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# The Proposal is Cost Effective

- U.S. EPA costs
- Worst case scenario

	Lifetime NPV Costs	Lifetime Nox Reduced (tons)	Cost Effectiveness (\$ per pound)
Medium Heavy-Duty	\$ 717	0.6	\$ 0.63
Heavy Heavy-Duty	\$ 915	5.1	\$ 0.09
<b>Weighted Average</b>	<b>\$ 797</b>	<b>2.41</b>	<b>\$ 0.17</b>

Source: Based on U.S. EPA's Final Regulatory Impact Analysis

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# Issues of Concern

- **Concern: Requirements have not been demonstrated technically feasible.**
- **Response:**
  - Only concerns previously raised are extreme operating conditions.
  - CD compliance by 2002.
  - Deficiency allowance.

# Issues of Concern

- **Concern: Federal timing constraints should apply to this rulemaking.**
- **Response:**
  - **Timing constraints do not apply to California.**
  - **No proposed change to standards.**

# Issues of Concern

- **Concern: On-going CD negotiations may result in modified NTE tests.**
  - **Non-CD manufacturers not included in CD negotiations.**
- **Response:**
  - **Deficiency allowance.**
  - **Plan periodic meetings with non-CD manufacturers.**

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# Conclusions and Recommendations

- **Need to extend CD requirements to prevent emission increases.**
- **Identical to CD requirements.**
  - **Minor differences for added flexibility.**
- **Proposal is cost effective.**
- **14 other states support our action.**
- **Recommend Board Approval.**